SIEMENS

Ingenuity for life

White Paper

Modernization made easy: Code conversion made simple

Siemens easy, no-charge code conversion via its Migration Studio can help companies modernize their industrial automation systems and become a future-ready Digital Enterprise.

Abstract

The Siemens Totally Integrated Automation (TIA) portfolio and software engineering framework provides next-generation digitalization solutions to help industries modernize their production infrastructures. Siemens provides no-charge tools in its Migration Studio to simplify the code conversion of other suppliers' PLC software, plus plenty of follow-up expertise partners to ensure the new code works as required. This paper explains the benefits of upgrading to Siemens most advanced controllers, as well as the steps involved in using Siemens Migration Studio, plus the post-conversion support provided for a successful modernization.

How to break out of your ICS supplier's "innovator's dilemma"

Around the world, industries of all kinds – extractive, process, fabrication, manufacturing and logistics among them – face a common challenge: outdated technology, especially controllers and related automation components of industrial control systems (ICSs). Factories and other facilities are using decades-old, limited-function controllers and automation systems that are nearing the end of their lifecycles. Is yours among them? While that infrastructure may be fully depreciated and appear to do its job just fine, it can load you with a wide range of hidden costs. These include:

- Lower efficiency compared to what can be gained from using to most advanced programmable logic controllers (PLCs);
- Little or no visibility into operating performance and diagnostics;
- Diminished reliability, with ever-rising costs of maintenance, repairs, and spare parts;
- Shrinking pools of operating skills and expertise, as increasing numbers of experienced workers retire;
- Growing production disruptions, in frequency and duration, due to lack of reliability, self-diagnostics, and easy maintenance and repairs.

All these costs can and will undermine competitiveness and profitability over time, if that time isn't already here. The problem for many operators of legacy ICSs is that their PLC suppliers have spent too much time milking the margins of their cash-cow PLCs and invested too little in advancing the the features and capabilities of those PLCs.

What Steve Jobs knew. In 1997, Harvard professor Clayton M. Christensen wrote a classic business book called "The Innovator's Dilemma," which many consider among the most influential business books of all time and one that the late Apple founder Steve Jobs kept on his bookshelf. In it, Christensen drew the distinction between sustaining technologies that support the status quo and disruptive technologies that bring to market new value propositions that weren't available previously.

The "innovator's dilemma" rests with suppliers of sustaining technologies that cannot allow true innovation to take root and flourish in their portfolios because doing so would disrupt their business models. As a result, their "innovations" are merely incremental. That's the case with many of the world's largest suppliers of PLCs and ICS components. In effect, their dilemma has become their customers' dilemma. But Siemens has taken a different approach.

Game-changers. Simply put, our Siemens Totally Integrated Automation (TIA) portfolio and TIA Portal, an easy-to-use, point-and-click single engineering framework, are game-changers. The TIA platform is founded on an open-systems architecture that spans the entire production process with shared foundational characteristics:

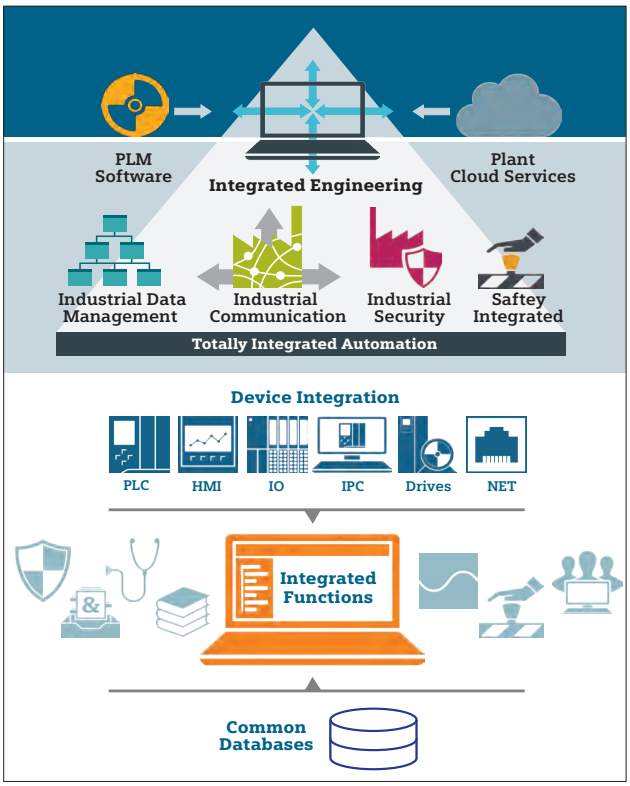
- Consistent data management
- Global standards
- Uniform hardware and software interfaces

These shared traits help to minimize software engineering time by as much as 30 percent, when the TIA Portal is used in the design, commissioning and maintenance phases. What's more, in thousands of deployments worldwide, TIA customers have dramatically cut production costs, operating expenses, and time-to-market, while gaining greater agility and flexibility to respond to new market opportunities. All this has sharpened their competitive edge, too.

With the TIA Portal and TIA components, users across all of the world's industries are creating their own Digital Enterprises that combine all of these capabilities in a single platform spanning all of their production processes:

- Integrated Engineering
- Integrated System Diagnostics
- Industrial Data Management
- Industrial Communication
- Industrial Security
- Safety Integrated
- Drive Integration
- Motion Control
- Motor Management

Migration or modernization?



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Some ICS operators elect to stay the course with their current PLC vendors. While they may believe such migrations might be simpler, faster, and less risky, they could miss out on the chance to evaluate how next-generation alternative platforms like the Siemens TIA portfolio and software engineering framework could provide a better path to making their business a truly Digital Enterprise.

Even if an ICS sticks with what its supplier suggests as a "new, improved" PLC, it still may need to convert code to the upgrade's programming software, plus train engineers and maintenance teams in it all, and last but not least, risk changeover downtime.

That's why, as long as a plant or facility must invest money, time, and effort in migrating to the next stage in its PLC supplier's portfolio roadmap, it might as well evaluate alternatives – ones that offer the most advanced features needed to sustain a true competitive advantage well into the future. If not, the migration might turn out to be a case of paving the proverbial cow path, instead of modernizing your facility with a new, high-speed ICS autobahn.

List of Rockwell® Controllers discontinued or nearing end of life

(as of September 30, 2015)

PLC-5® Series

- PLC-5/11 obsolete / discontinued
- PLC-5/20 obsolete / discontinued
- PLC-5/20e obsolete / discontinued
- PLC-5/40 obsolete / discontinued
- PLC-5/40e obsolete / discontinued
- PLC-5/60 obsolete / discontinued
- PLC-5/80 obsolescence planned / end of life
- PLC-5/80e obsolescence planned / end of life

ControlLogix®

L61 obsolescence planned / end of life
L62 obsolescence planned / end of life
L63 obsolescence planned / end of life
L64 obsolescence planned / end of life
L65 obsolescence planned / end of life
L61S obsolescence planned / end of life
L62S obsolescence planned / end of life
L632 obsolescence planned / end of life

SLC 500 (1747 Series)

SLC-5/01 obsolete / discontinued
SLC-5/02 obsolete / discontinued
SLC-5/03 obsolescence planned / end of life
SLC-5/04 obsolescence planned / end of life
SLC-5/05 obsolescence planned / end of life

MicroLogix™ (176x Series)

MicroLogix 1000 obsolete / discontinued
MicroLogix 1200 obsolescence planned / end of life
MicroLogix 1500 obsolete / discontinued

Verify the current Product Lifecycle Status of your PLCs at: http://www.rockwellautomation.com/global/solutions-services/capabilities/migration-solutions/product-search/overview.page?

Modernization made easy: Simplified code conversion – with follow-up support

A new ICS autobahn doesn't have to be more expensive or disruptive than sticking with your current supplier. That's especially true if it's built from the broad range of highly sophisticated yet plug-and-play PLC, I/O, HMI, communications, and other components, like what's in the Siemens TIA portfolio and programmed with its TIA Portal.

The TIA portfolio's adherence to global standards helps to ensure interoperability with other vendors' legacy components and systems. And Siemens experts know how to bridge yesterday's systems with know-how and experience drawn from thousands of modernizations around the world and across virtually all industries. That's one big risk factor the Siemens TIA platform fully addresses.

Introducing Migration Studio. An important modernization concern is code conversion. For that, Siemens invested in developing, testing, and refining a set of code-conversion tools called the Migration Studio. This powerful software tool converts legacy data files and tags, logic files, program files, tasks, and routines, and then exports them to the TIA Portal. Once your code is inside the TIA Portal, you can modify it, if necessary, and re-purpose it for use with PLC, I/O, HMI, communications, and other components from the TIA portfolio. The code can also be combined with vast libraries of existing TIA Portal code developed and proven for specific production functions and processes. Keep in mind that this process is designed to securely protect the intellectual property of your code and keep it totally confidential. Siemens understands this is your intellectual property and will not use, distribute, or share your code – and will sign any non-disclosure agreements necessary.

while upgrading you to the state-of-the-art TIA Portal. The Siemens Migration Studio retains your current structures and naming conventions, which provides code familiarity, right from the start. This will allow you to meet the challenges of future automation architectures by building on today's existing code.

This service converts your code to a choice of Siemens controllers, either the SIMATICS S7-1200 or S7-1500, the most advanced PLC models in the Siemens portfolio. If code optimization or data "clean-up" is required, a Certified Siemens Solution Partner is ready to assist. To complete this process, a Siemens Migration Expert will visit your site to discuss and deliver your newly modernized project and also to advise on ways to further optimize your ICS.

Overview of the code-conversion process. The following diagrams illustrate the process of converting Rockwell code to code usable by the SIMATICS S7-1200 or S7-1500 PLCs. Starting first with what the exported code looks like, Siemens has taken care to keep it looking familiar, so new TIA Portal users can learn the system and become productive more quickly than if the code appeared foreign to them.

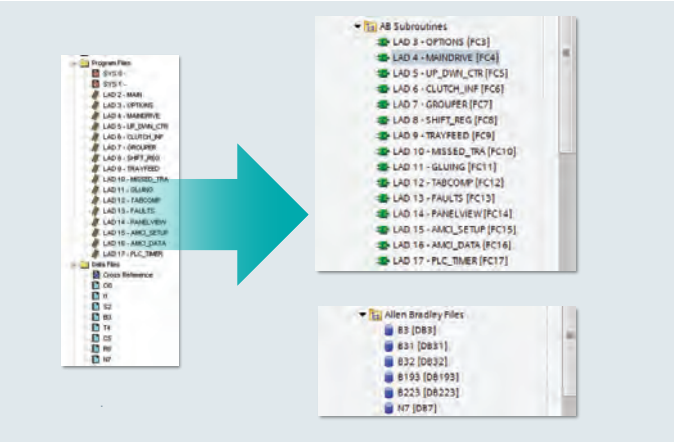

Figure 1. The Siemens Migration Studio converts Rockwell code to state-of-the-art code, usable in the TIA Portal for the SIMATICS S7-1200 or S7-1500 PLCs. Note how the new code retains the Rockwell structures and naming conventions, providing new TIA Portal users with familiar-looking code right from the start.

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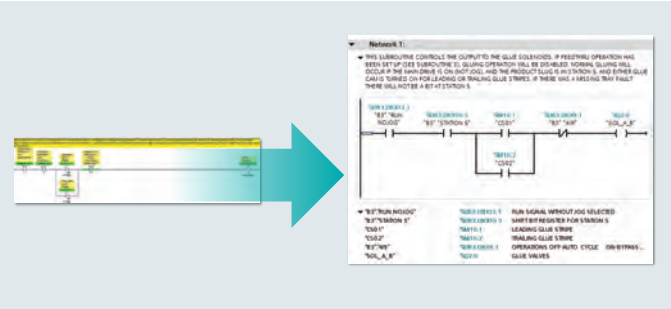


Figure 2. The Siemens Migration Studio keeps all Rockwell ladder logic intact – including comments. As in Figure 1 above, this helps keep code familiar within the new TIA Portal, so new users can be productive right away. The TIA Portal, a common software engineering framework, can deliver up to 30 percent time-savings, sometimes more.

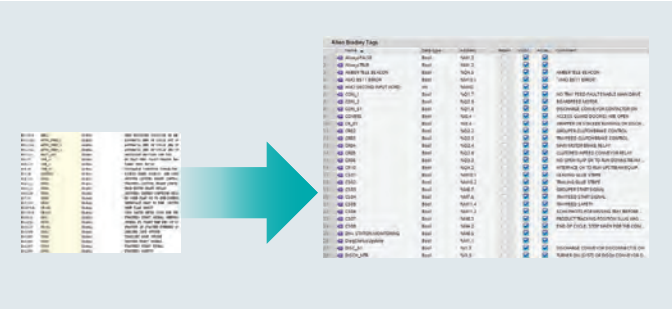


Figure 3. This illustration shows how the Siemens no-charge Migration Studio keeps tag names identical, while retaining comments. This provides familiarity to new TIA Portal users, so they can become much more productive much more quickly and start realizing significant time savings in their software engineering efforts.

Modernization made easy: Follow-up support and the 10-step process overview

Follow-up Siemens support was mentioned briefly in the previous section, but it's worth expanding on in this section because it can provide great value in many ways – again, at no charge. You can gain access to the Siemens Migration Studio by completing an online form via the Siemens website at the following link: www.usa.siemens.com/code-conversion

At the time of submission, you need to: (1) email a simple, one-line drawing of your ICS architecture that you want to modernize, such as in the example illustrated in Figure 4 at the right; and (2) email an exported file of your Rockwell code.

The Siemens website has downloadable instructions on how to export from these configurators:

- RsLogix 5®, used to configure PLC-5 controllers
- RsLogix 500, used to configure SLC controllers
- RSLogix 5000, used to configure Logix controllers

Within five business days of submitting the form, a Siemens code conversion expert will contact you to discuss your ICS modernization requirements and set up a convenient time to visit. This is a trained automation engineer – not a sales person or telemarketer – who will provide a no-charge, onsite consultation and assessment of your needs. In many cases, this person will be a former Rockwell engineer.

As part of your consultation on modernizing your ICS, your Siemens expert will walk you through the 10 steps to a pain-free, successful migration of your legacy controllers to an advanced Siemens SIMATIC version, either an S7-1200 or S7-1500 PLC model. The steps involved are outlined in Table 1 that follows.

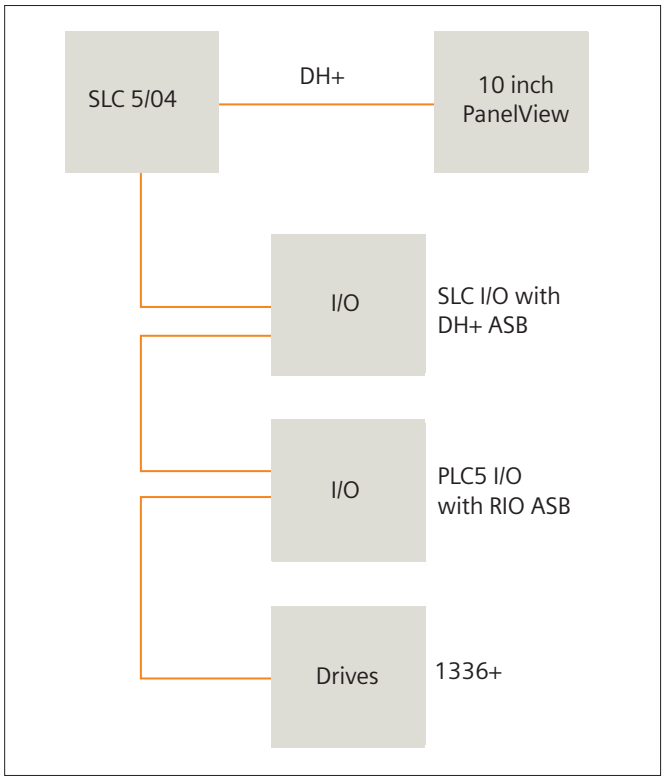
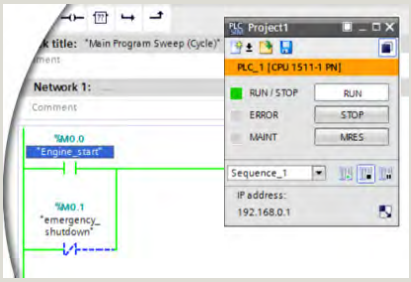


Figure 4. This simple, one-line drawing of the ICS architecture to be modernized will help your Siemens code-conversion expert understand the components and connection of your legacy system.

Table 1. 10 Steps to a successful modernization of a legacy ICS currently using non-Siemens controllers

1 Inspect		**Physically inspect application / machine for fit, networking and function** • Physically review the system to be migrated • Determine the panel space and locale space for mounting an additional panel if required
2 Obtain		**Obtain a copy of the current documentation for hardware and software** • Get drawings of the physical application and a copy of the application program
3 Develop		**Develop the hardware solution** • Analyze the current I/O and determine if special hardware is being used • Cross reference the I/O to appropriate SIMATIC I/O • Locate an appropriate Siemens solution for any special hardware being used such as that supplied by AB Encompass partners • Choose and configure an appropriate SIMATIC PLC and configure it in TIA Portal • If required to connect to a specific network, determine an appropriate gateway or SIMATIC solution
4 Migrate		**Migrate control code** • Migrate the existing AB programs using the TIA Migration Tool • In the event that a SIMATIC library function is not available for a specific AB function, create a SIMATIC library function and add it to the SIMATIC AB library • Create SIMATIC functions for any new hardware or gateways that will be used • Create the Main calling routine(s)
5 Add		**Add advanced diagnostics** • Add PROGRAM_ALARM for diagnostic messages to the S7-1500 display and HMI • Configure the HMI(s) in TIA Portal • Verify the HMI Connection(s) • Configure the HMI Tags • Configure the HMI Graphics • Configure the HMI Alarms • Configure the HMI Trending • Configure the PLC/HMI security

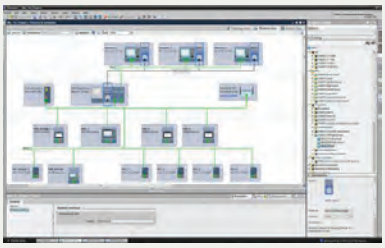
6 Test



Test the application using simulation

- Test the new configuration using simulation
- Correct any issues found during simulation

7 Update



Update documentation

- Develop preliminary drawings for the application using the new SIMATIC hardware
- Develop an operator/maintenance manual for the plant

8 Install

Install on-site

- Take the new system to site and install it
- Wire the IO using the fastest method possible
- Adapt the network configuration to the plant network infrastructure used such as that supplied by AB Encompas partners

9 Start

Start up on-site

- Startup and test the new application

10 Train

Train plant personnel

- Modify and document the updates to the application hardware
- Modify and release the final drawings for the application
- Archive the application code
- Get acceptance sign-off from customer
- Deliver all documentation and drawings to the customer

Modernization: The time to move is now

With each passing day, legacy ICSs using aging or obsolete controllers are eroding the profitability and competitiveness of their operators. If your plant or facility is among them, Siemens invites you to consider modernizing your ICS with game-changing, advanced PLC technology from the Siemens TIA portfolio— and programmed with the Siemens TIA portal's common software engineering framework. Siemens wants your business, making substantial investments in the resources and tools necessary to ensure your ICS modernization is as painless, easy, and risk-free as possible.

Proven worldwide. Around the world, thousands of Siemens TIA customers have used advanced SIMATIC technologies and the TIA Portal to dramatically cut production costs, operating expenses, and time-to-market. At the same time, they've gained more agility and flexibility to respond to new market opportunities. This has helped them become more competitive, too.

Below are just some of the ways, the Siemens TIA Portal and portfolio are helping them to do all this, boosting their returns on investment much higher than had they stayed with their legacy PLC suppliers.

If you're finding that your legacy ICS is running low on performance, it's time to evaluate alternatives. The sooner you act, the sooner your operations will become a more competitive, more profitable Digital Enterprise that's well positioned for future decades to come.

TIA optimizes the entire manufacturing process, leading to increased ROI

BENEFIT		
Improved engineering efficiency	RESULT	Lower design costs
Integrated diagnostic functions	RESULT	Minimized downtime
Integrated communication tools	RESULT	Production flexibility
Integrated security functions	RESULT	Enhanced plant and network security
Technologies that protect personnel, machinery and the environment	RESULT	Improved safety
Single, streamlined database	RESULT	Higher data quality
Streamlined access to data	RESULT	Smarter decisions
Global standards	RESULT	Simplified implementation of automation solutions

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